

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

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In the Matter of)

PUBLIC UTILITIES COMMISSION)

Instituting a Proceeding to Investigate)
the Implementation Of Feed-in Tariffs)
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Docket No. 2008-0273

HAIKU DESIGN AND ANALYSIS

OPENING BRIEF

AND

CERTIFICATE OF SERVICE

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HAIKU DESIGN AND ANALYSIS

OPENING BRIEF

Carl Freedman, dba Haiku Design and Analysis (HDA) respectfully offers its Opening Brief regarding the implementation of feed in tariffs for Hawaiian Electric Company, Inc., Maui Electric Company Ltd. and the Hawaii Electric Light Company, Ltd. (collectively: HECO Companies).

In this brief, HDA provides several observations and recommendations based on the record in this proceeding. This brief does not attempt an exhaustive treatment of the challenging list of difficult issues in the docket. HDA focuses on those issues about which it can offer what it hopes might be some clarity and constructive substance.

HDA provides some initial general comments, then outlines a summary of its basic recommendations, followed by more detailed recommendations in the format of the revised list of issues in this docket. HDA does not provide discussion on several of the issues, in some cases because HDA has no comment and in some cases because time did not permit an adequate discussion.

GENERAL COMMENTS

(1) The Order Establishing Hearing Procedures in this docket established restated issues to be addressed in this proceeding and identifies a challenging list of decisions the Commission must make once the record closes. One fundamental decision the Commission must make is whether the record is sufficient to make the required decisions. HDA has certainly struggled unsuccessfully to resolve several important matters based on the information available.

In its Opening Statement of Position (SOP) and its Final Statement of Position (FSOP) HDA maintained the rather glib position that important information was missing that is necessary to determine project-cost-based feed-in tariffs.

In particular, there is still no generation and transmission system plan that identifies how much of each type of generation is compatible or necessary to accommodate new renewable generation. It is not known how much of each type of renewable generation can be accommodated. It is not known what measures, improvements and investments in utility system infrastructure would be necessary to accommodate various amounts of new renewable generation. It is not known when, whether or to what extent any measures being taken to accommodate substantial amounts of new renewable generation on the utility systems will be effective. There is no estimate of any sort of what impacts the proposed (or any other) feed-in tariffs will have on generation costs or retail rates. The rate impacts are entirely unknown. (HDA FSOP at pages 1 – 2)

HDA argued that we are proceeding quickly and without a master plan that would indicate what technologies would best meet Hawaii's renewable portfolio standards (RPS) and what specific role the proposed feed-in tariffs should play in the acquisition of Hawaii's renewable energy resources. It is difficult to address the issues of whether feed-in tariffs are prudent and just and reasonable, what caps and limits are appropriate and what pricing policies should be implemented without the context that would be provided by an overall

plan sufficient to show how the pieces of the puzzle should best fit together, what alternatives are available, what mix of alternatives is optimal and how much it will all cost.

It was clear from questions by the Commission during the panel hearings that the Commission is well aware of the shortcomings in evidence and that the Commission is being pushed outside its comfort zone by the some of the proposals in this proceeding. It was clear from the moderator's observations that the Commission is being asked, both by statute and by specific proposals, to step into some uncharted legal waters. HDA does not need to excessively compound these doubts in this brief and will not do so further except to note that what lies before the Commission and its staff is a difficult set of tasks. It is not clear to HDA how the Commission will be able to resolve resolute answers to the list of necessary decisions identified in the Order Establishing Hearing Procedures.

HDA proceeds with this brief assuming that all legal and evidentiary obstacles will be met and that the Commission will proceed with implementation of initial feed-in tariffs. HDA offers the following discussion to assist the Commission in crafting the best initial tariff offering possible.

SUMMARY OF BASIC RECOMMENDATIONS

A summary of HDA's recommendations in this docket is provided in outline form below. Some of these recommendations are addressed in more detail further below in the context of discussion of the list of issues identified by the Commission in this docket:

(2) Feed-in tariffs (FiT's) can serve a useful and constructive purpose as an addition to the existing generation resource procurement options (Schedule Q, net energy metering, competitive bidding and non-bid PPA's).

- HDA supports, at a minimum, basic FiT's for smaller distributed renewable energy projects (such as the FiT's proposed by the HECO Companies in this docket). This would provide economic efficiency and encourage implementation of smaller renewable generation projects by reducing market entry barriers, lowering transaction costs and reducing front-end project risks. In this role FiT's could reduce resource procurement costs, streamline interconnection procedures and fill a niche not addressed by existing resource procurement methods.
- HDA supports a generic FiT for distributed renewable energy projects priced below or at the lower end of the range of long range avoided cost estimates. This would provide a means to accommodate and encourage cost effective projects and serve as a replacement for the existing Schedule Q tariff for new projects.
- For intermediate and larger sized renewable generation projects, FiT's could accelerate the implementation of renewable generation in Hawaii but with substantially increased planning, regulatory and administrative complications. The determination of the scope of projects eligible for the initial FiT's and the

relative roles of the other existing generation procurement options is a major issue to be determined in this docket.

(3) The Commission should consider the best method of determining the price of each FiT based on the specific objectives, circumstances and available information regarding each FiT. Several pricing methods may be appropriate.

- Determining FiT prices based on the developer's costs (plus or including profit) is one of several approaches that should be considered.
- The provisions in the "Energy Agreement", including the provision that FiT's should be based on project costs plus a reasonable profit, are not binding on the Commission. In fact, it is the role of the Commission to examine all aspects of the Energy Agreement proposals.

(4) The Commission should not embark on a new "branch" of regulation to ensure that FiT's are "just and reasonable" to renewable project developers.

- The objective of project-cost-based pricing is to determine and provide sufficient prices to drive implementation of renewable resources. The examination of the costs of renewable generation projects should be limited to this purpose.
- The "just and reasonable" standard currently applies and should continue to apply only to the utility and its customers, not to independent power producers.¹

¹ Even to the extent that "just and reasonable" applies to wholesale generation in statutes and case law, the object of the term is limited in scope to the utility and its customers.

- The Commission and the Consumer Advocate do not have the resources, nor would it otherwise be appropriate, to expand their scope of duties to include cost-based regulation of independent power producers.

(5) Prices for the initial FiT's can be determined and structured to minimize costs and rate impacts. HDA suggests a process for designing and determining FiT rates explained in the discussion of issue VIII below.

- Prices for each FiT contract can be escalated during the term of the contract to more closely match increasing avoided costs and reduce rate impacts. Prices could be structured so that the net present value of the increasing stream of prices is identical to nominally levelized prices. (see discussion of issue IV.13.)
- FiT prices could be set initially at the lower end of the range of project costs to capture the most cost effective projects and then increased as necessary to acquire the desired penetration of projects.
- Where caps are necessary to limit FiT subscription due to rate impact concerns, prices could be offered in blocks of limited size with declining prices in successive blocks (i.e. 10MW at \$.20 per kWh, 10MW at \$.18, 10MW at \$.16 per kWh, etc.). This would limit the amount of subscription above avoided cost and would provide market-based information to the Commission regarding the most economical price for encouraging resource subscription.

- (6) The Commission could proceed with this docket and implement FiT's in phases.
- Determine in this stage of the proceeding which technologies and/or FiT designs should proceed to the next stage of the proceeding for further development in the initial FiT offering.
 - Identify which technologies should proceed to the next stage of the proceeding for detailed development and pricing.
 - Resolve as many FiT policy and design issues as possible based on the current evidentiary record at this point in the proceedings.
 - Revisit the schedule of proceedings to determine whether any changes should be made to provide the necessary information and review of the detailed development and pricing.
 - Proceed with detailed development and pricing of a set of FiT's in the next stage of this proceeding.
 - Withhold final determination of the reasonableness of each of the FiT's until after all specific prices, caps and terms have been resolved for each technology.
 - Implement the initial FiT offerings by order.
 - Identify the time period for major review of the FiT program and any interim reviews of the established FiT's.
 - Evaluate the FiT program after several years to determine whether FiT's should be continued, amended or expanded to include other technologies.

- Evaluate the performance of FiT's based on experience to date.
- Evaluate the FiT's in light of currently unavailable but necessary information:
 - An examination and determination of a utility resource plan that identifies a viable and optimal mix of resources and programs to meet Hawaii's RPS and energy needs, including a timetable for implementation of necessary utility grid improvements and acquisition of specified resource technologies
 - Determination of the capacity of the existing utility systems to integrate and accommodate as-available renewable resources
 - Determination of reliability standards to be applied in system planning and operation
 - Determination of the amount of necessary curtailment of renewable resources under existing system conditions and with anticipated renewable generation additions and grid improvements
 - Determination of the role of planned large wind and cable projects and resulting impacts on the viability and potential penetration of other renewable generation projects
 - Determination of the costs and rate impacts of all of the resources, improvements and programs above

(7) The Commission could also require several measures to improve the transparency, efficiency and fairness of resource procurement generally:

- Require development and provision of information regarding utility circuit loading and distributed energy penetration. It is proposed that FiT and net energy metered subscription be initially limited by distribution level “circuit” to 15% of the circuit demand. The current status of the subscription on each circuit is not currently known. The HECO Companies expressed some reluctance to make this information available to the public. The lack of information and the unavailability of information presents a market barrier that could be mitigated. The Commission could require the HECO Companies to determine (and make available by a reasonable method), for each circuit, the current demand, current distributed generation subscription and the amount of any planned or “queued” distributed generation subscription.
- Require development of system reliability standards. There are currently no system reliability standards adopted or applicable to the HECO Company systems that are meaningful in determining the amount of distributed generation or as-available generation that can be accommodated without adversely affecting service reliability. There are no standards that can serve to determine what demand response, load management, energy storage or grid improvement measures could mitigate or accommodate increasing levels of

distributed and/or as-available generation. The Commission could initiate a process or could direct the HECO Companies to initiate a process to develop reliability standards.

RESTATED ISSUES IN THIS DOCKET:

In its Order Establishing Hearings Procedures in this docket dated April 1, 2009, the Commission established a restated list of issues for this proceeding:

I. Given the four existing renewable producer options (Schedule Q, net metering, competitive bid, and non-bid PPAs), what contribution should FiTs make toward achieving Hawaii's renewable energy goals?

(8) In considering the scope, design and pricing of the initial FiT's the Commission should consider the role and purpose of implementing FiT's in the context the four existing supply resource procurement mechanisms. HDA identifies four distinct potential roles that FiT's could play in the procurement of renewable generation resources. Each FiT could serve one or more of the following potential roles:

- Role A. For smaller renewable projects, FiT's provide a means to lower project transaction costs and reduce developers' front-end project risks.
 - In this role FiT's could lower the costs of acquiring smaller renewable projects by providing economic efficiency.
 - For smaller projects up-front transaction costs and the risks associated with the possibility that a PPA might not be acquired (which would be mitigated by

FiT's) are a larger proportion of total project costs and risks (and potential benefits) than for larger projects.

- In this role FiT's would address an existing market entry barrier for smaller projects in the Commission's portfolio of resource acquisition mechanisms. Except for net energy metering (which is limited in project size to on-site customer loads), all of the existing procurement mechanisms require substantial up front project costs and uncertainty regarding project acceptance, including negotiating a PPA with the utility and specific approval by the Commission. These can be preclusive for smaller projects.
- The FiT's proposed by the HECO Companies would serve this role.
- HDA maintains that this role for FiT's in Hawaii has clear merit and that FiT's to serve this role are worth pursuing regardless of whether FiT's designed to meet the other roles identified below are implemented.
- Role B. FiT's could serve as standard offers to procure cost-effective resources.
 - A generic FiT priced below or at the lower end of the range of long range avoided cost estimates would provide a means to promote cost effective projects.
 - This could replace Schedule Q for new qualifying facilities and allow delinking of new project pricing from avoided costs as specified in HRS 269-27.2.

- HDA maintains that this role for FiT's in Hawaii has clear merit and that a FiT to serve this role is worth pursuing regardless of whether FiT's designed to meet the other roles identified here are implemented.
- Role C. Aggressively priced FiT's or FiT's based on project costs could accelerate the acquisition of substantial amounts of renewable generation.
 - FiT's address a list of concerns expressed by several renewable developers that: the other resource procurement mechanisms (competitive bidding and non-solicited negotiations) are cumbersome, utility dominated, require excessive up front project cost and risk and generally have not been resulting in substantial renewable resource acquisition.
 - This is the most highly "advertised" role and purpose for FiT's in the Energy Agreement rhetoric and is a primary reason there is so much interest from renewable developers in this docket.
 - Unlike other procurement mechanisms, however, aggressively priced and/or project-cost-based FiT's are not inherently structured to control or minimize costs or rate impacts.
 - Since aggressively priced FiT's would require utilities to accept large or unlimited amounts of renewable generation projects by tariff without project by project review and approval, it is necessary to ensure that the FiT design and terms, (caps, limits or conditions) prevent undue burdens on the utility or result in uneconomic resource procurement.

- Role D. FiT's based on utility system value added could be designed to encourage innovation and investment in renewable generation sources that provide beneficial system services.
 - FiT's could be unbundled to create a market that pays for the value of various services provided to the utility systems such as bulk energy, operation reserve, load shaping, firm supply, dispatchability and other ancillary services.
 - FiT pricing could include decrements for projects that require excessive grid support services (projects requiring var support or uncharacteristic operation reserve)
 - Unbundling of FiT prices could be done for individual technologies or generically.
 - For example, some thermal solar technologies can provide short term energy storage to shift generation to meet evening peak loads and could be designed to provide operation reserve. This will only happen if pricing (otherwise only denominated in terms of kWh delivered) is structured to encourage the necessary added investment and innovation to provide service value.
 - This role for FiT's has not been sufficiently well developed for implementation of the initial FiT's except perhaps for specific applications in conjunction with FiT;s for individual technologies where important attributes

of the technologies can be clearly differentiated (as in the example for solar thermal technologies above).

(9) The role and relationship between each of the four existing procurement methods is not clear in several respects and could be better clarified. For each type and size of potential new renewable generation resource there should be an appropriate procurement mechanism and this should be clearly designated.

(10) If there is limited capacity for one or more renewable generation technologies (due to system integration constraints or economic reasons), then the interrelationship of the limits, caps and queues for the various procurement mechanisms needs to be clearly determined.

1. Should the Commission state a quantitative goal for renewable purchases in Hawaii generally and for FiTs specifically?

Generally: Ultimately, yes... but this should be based on planning information that addresses the best way to meet the state's RPS goals. This information has not yet been developed.

For FiTs: Yes, for each technology based on the objectives identified for each technology. This should be based on planning information that has not yet been developed. See HDA recommended approach to setting fit rates described under issue VIII. below.

2. Are there gaps or suboptimalities in present programs that make FiTs necessary to achieve Hawaii's goals?

It has not been determined that FiT's are absolutely necessary for Hawaii to achieve its goals. There are definitely "suboptimalities" in the existing resource procurement options. These are among the primary reasons for the enthusiasm for FiTs by various potential renewable generation producers in this proceeding. These include:

A lack of RFP's for competitively bid renewable generation projects

Dominant utility control, slow processing and uncertain outcomes of competitively bid and non-solicited bid projects.

Lack of transparency and trust in resource procurement processes

Gaps in eligible size for projects for different procurement mechanisms

3. Net metering: Should net metering be continued, without change, in the presence of a FiT? If not, what renewables (technologies and sizes) should Net Energy Metering apply to and what renewable should FiT apply to?

Until a FiT tariff is in place and actually functioning to successfully procure renewable resources, the existing net metering program should be left unchanged. Initially the FiT program should be implemented as a parallel option, noting that it would be more widely available and provide opportunities for systems larger than customer loads at sites appropriate for larger installations. The net metering program is currently functioning to provide solar photovoltaic penetration and is supporting a growing industry in Hawaii. There is no reason to needlessly stall this industry by a premature transition to a new tariff structure until the new structure is proven and functioning.

4 Schedule Q: Should Schedule Q be continued, without change, in the presence of a FiT? If not, what renewables (technologies and sizes) should Schedule Q apply to and what renewables should FiT apply to?

Schedule Q should be continued unless other procurement programs cover all possible renewable projects. PURPA requires utilities to purchase energy from qualifying facilities. Schedule Q is not required by PURPA, but unless and until all possible PURPA qualifying renewable projects are eligible for some other means of procurement and compensation, it will continue to be necessary to have some means to determine a reasonable payment for energy.

Consistent with HRS 269-27.2, it may be reasonable to encourage or require payment to qualifying facilities that would otherwise qualify for Schedule Q, to a payment stream that is not linked to the “spot” avoided cost price now determined by the Schedule Q tariff.

HDA recommends that a generic FiT be implemented as one of the initial FiT's implemented in this docket. This would avoid the need for a Schedule Q tariff and provide delinking from avoided costs consistent with HRS 269-27.2.

5. Negotiated power purchase agreements: Should present practices be continued, without change, in the presence of a FiT? If not, what renewables (technologies and sizes) should present practices apply to and what renewables should FiT apply to?

Some framework or transparent protocols should be established to govern unsolicited bids. These bids and the process used to negotiate these bids are now invisible to any stakeholders other than the utility.

If any caps or limits or queuing procedures are adopted for other procurement procedures these somehow need to be conjoined with a queuing process for unsolicited bids, otherwise the “invisible” unsolicited bid process will allow priority to limited “space” on constrained utility system grids.

For some technologies it may be determined that the project size caps for FiT's should include all projects up to the minimum threshold project size for the competitive bidding framework. In this case, for the technologies within the scope of the FiT, the unsolicited bid process would not be used.

6. Competitive bidding: Should present practices be continued, without change, in the presence of a FiT? If not, what renewables (technologies and sizes) should present practices apply to and what renewables should FiT apply to?

Regardless of whether FiT's are implemented the Commission could direct the utilities to issue competitive RFP's for acquiring renewable resources that are above the size limits for NEM and FiT's but below the minimum size threshold for competitive bidding.

One thing that needs to be considered in the near term is the fact that the competitive bid process is tied to and contingent upon the IRP process... but the IRP process has been suspended pending the design, consideration and approval of a revised framework and later implementation and approval of each complying utility plan. The competitive bidding framework seems to be effectively suspended for some extended period of time.

II. What are the physical limitations on the utility's ability to purchase renewable?

The record indicates that the physical limitations on the utilities' ability to incorporate "as available" renewable generation have not determined. There is considerable uncertainty on this matter. For example, on one hand HECO states that penetrations of wind generation that would be acquired by feed-in tariffs must be limited because of concerns regarding integration with the utility generation system and maintaining adequate system reliability. On the other hand, HECO is planning and negotiating in other venues for addition of two large (two hundred megawatt) wind and cable projects. It is not clear what the total capacity of HECO's system will be to accommodate wind resources, what measures will be necessary to accommodate and mitigate the addition of wind resources or how this available capacity would be allocated to grandfathered, competitively bid, unsolicited bid or feed-in tariff procurement procedures.

**Concerning standards and procedures to ensure that FiT sales promote reliability:
Should they be part of the tariffs, or should they exist outside the tariff (e.g., in
interconnection rules or in project-by-project negotiations?**

III. What are the appropriate criteria for eligibility to sell under FiT tariffs?

- 1. Which technologies should be eligible for the FiT?**
- 2. What is the maximum and minum capacity of projects that should be eligible for**

the FiT?

- 3. Should projects owned by utilities of their affiliates be eligible for the FiT and, if so, under what conditions?**

IV. What decisions are necessary to ensure that FiT rates are just and reasonable, as required by Hawaii law?

HDA offers several observations and recommendations.

(11) The Commission should not embark on a new “branch” of regulation to ensure that FiT’s are “just and reasonable” to renewable project developers. The objective of project-cost-based pricing is to determine and provide sufficient prices to drive implementation of renewable resources. The examination of the costs of renewable generation projects should be limited to this purpose.

The “just and reasonable” standard currently applies and should continue to apply only to the utility and its customers, not to independent power producers. The Commission and the Consumer Advocate do not have the resources, nor would it otherwise be appropriate, to expand their scope of duties to include cost-based regulation of independent power producers.

(12) There are several conventions typically applied to determine whether non-utility projects and/or rates are reasonable. Most generally, the concept of avoided cost is used as a regulatory standard to determine whether a project would cost more or less than the status quo. In the context of evaluating individual projects, the HECO Companies employ a differential revenue requirements analysis to determine whether incorporation of a project in the utility mix of resources would increase or decrease long term utility revenue

requirements. In the context of long range planning, revenue requirements analyses are applied to a spectrum of resource strategies to determine optimal resources and projects based on long term revenue requirements and total resource costs. In the context of resource procurement, competitive bidding procedures determine the most economical project(s) within the scope of the RFP. Each of these conventions includes some means to determine whether the projects or rates in question are reasonable by comparison to other viable alternatives.

(13) The avoided cost standard, although conventional and broadly applied is not absolute. Rates above or below avoided costs may be just and reasonable. For example, if fully allocated wind project-based-costs are substantially below avoided costs, then rates set at or just below avoided costs would not represent the most economical or reasonable rates from the perspective of the utility or its ratepayers. Some projects could be found to be reasonable even rates are above avoided cost. For example, rates for net energy metered projects are above avoided costs but are considered reasonable since statutes require net energy metering. Similarly, renewable projects may be reasonable, even if above avoided costs based on conventional resources, since they are required by RPS statutes.

(14) A distinction should be drawn between short run spot avoided costs and long run avoided costs. Short run spot avoided costs are based on the short run marginal cost of energy at a particular time. Schedule Q rates are short run spot avoided costs. Long run avoided costs are based on a discounted summation (net present value) of costs over an extended analysis timeframe taking into consideration changes in the timing and mix of

resources additions and retirements that would occur in the analysis timeframe. Long run avoided costs are essentially the standard used in differential revenue requirements analysis and long range planning studies.

It is important to consider both short run and long run avoided costs. Short term avoided costs provide a standard to determine whether FiT rates would have rate impacts. Long term avoided costs indicate whether projects or FiT rates are cost-effective on a life cycle basis. Rates should be examined and found to be reasonable with respect to both considerations. This does not mean that FiT rates must be below both short term and long term avoided costs. It means that if rates are above either or both avoided cost standards, the reasonableness of the rates should be justified for some reason other than beneficial rate impacts or cost-effectiveness.

(15) In applying avoided costs as a standard it is essential to ensure that the avoided costs are properly determined for the specific application. This includes consideration of the implicit and explicit assumptions in the analyses used to determine avoided costs and the general framing of the avoided cost analysis. For example, avoided costs can be based on a “least cost” generation plan or they could be based on a preferred generation plan. In the case of evaluating FiT’s against avoided costs, the avoided costs should used that are based on analysis of the total system costs of meeting the Hawaii RPS with an optimal mix of supply resources, grid improvements, demand response/load management programs and energy efficiency programs.

(16) Whether the FiT rates proposed in this docket are above or below long run avoided costs is untested. Long run avoided costs appropriate for application to the FiT rates in this proceeding have not been developed.

(17) FiT rates that are determined based on technology project costs may cost more or less than other alternative technologies and may result in prices more than other types of procurement mechanism such as competitive bidding. There are two discernable factors. First, is the technology cost-effective? Second, is the project-cost-basis an effective means to set the price?

Ultimately, project-cost-based FiT rates are reasonable only if either (a) they are less than the cost of other viable alternatives (with commensurate characteristics) or (b) the projects are determined to be reasonable irrespective of (or after consideration of) the higher costs.

(18) One straightforward process to determine the reasonableness of Fit (or other) rates is based, at root, on the statutory RPS requirements and a process to determine the most reasonable way to meet the RPS. This method is not immediately accessible for the purposes of this docket but is nevertheless outlined below to demonstrate a viable approach:

- The RPS statute requires that specified percentages of renewable generation must be implemented by certain future dates.
- A planning process would determine the best mix of resources to meet the RPS. This would include consideration and determination of the best mix of supply resources, grid improvements, demand response/load management

programs and energy efficiency programs to meet the RPS and other utility system objectives.

- A planning process would determine the necessary timing of implementation of the optimal mix of resources, improvements and programs.
- A planning process or regulatory process would determine the best resource procurement mechanisms to use to most effectively and cost effectively implement the resources, improvements and programs.

If, after going through this process, it were determined that a specified amount of a particular renewable generation technology was necessary or optimal and would be best acquired through a FiT, then a project-cost-based FiT would clearly be just and reasonable. The basis for this finding would be that, by probative analysis, the resource is the best (or an optimal) alternative taking its cost into consideration. Note that such a resource might very well cost substantially more than the Schedule Q spot price or the long term avoided cost based on the resource mix of the existing utility system.

(19) At this point in this docket it is clear that we do not have any basis as clear as what would result from the process described above to determine whether the technologies considered for FiT's are necessary or optimal. We don't know how much of which types of resources are optimal or will be required by what dates. We don't know how much of each resource type can be accommodated by the existing and developing utility system grids without curtailment.

We do know, however, that substantial renewable resources will be required to meet the RPS and that, generally, starting to acquire renewable resources sooner is better than waiting for the results of analyses that may be a long time coming. As a matter of policy, it might be determined that we need to be aggressive in acquiring renewable resources and should start to remove market barriers and get the process of resource acquisition moving along. This policy has been expressed in much of the recent Hawaii legislation encouraging implementation of renewable generation and reducing reliance on fossil fuel.

(20) HDA thus offers the following standard regarding the reasonableness of project-cost-based initial FiT rates: To the extent that it is clear that (a) the technologies acquired by an initial FiT offering will ultimately be required as part of an optimal mix of resources in order to meet the Hawaii RPS and (2) the FiT is a reasonable method to acquire renewable resources compared to other procurement methods (including consideration of whether the FiT rates are less or comparable to rates that would result from other procurement methods), then it would follow that the FiT rates, which represent the costs to acquire these resources, are reasonable.

1. Should the FiT facilitate the cost recovery of only the most cost-effective projects, a typical project, or most projects?

HDA outlines a procedure for pricing FiT's in its discussion of issue VIII. below. This approach would initially capture more cost-effective projects and proceed to capture more expensive projects as needs for project subscription increase.

- 2. What is a reasonable return on equity for a FiT project?**
- 3. What cost and performance information is needed to calculate FiT rates?**
- 4. What are appropriate methodologies for calculating FiT rates?**

HDA proposes a methodology for designing and setting FiT rates in the discussion of issue VIII. below.

- 5. What interconnection costs should the FiT developer bear?**
- 6. How should FiT participants be compensated for curtailment?**

The periodic curtailment of renewable generation due to utility system demand and operating conditions is a problematic issue in determining reasonable contract and pricing terms. This issue is not unique to FiT's and exists to lesser or greater degrees with all of the existing resource procurement methods with the exception of net energy metering (which is not subject to curtailment). Several factors should be considered:

- There is currently no means for the utility or a non-utility power producer to know how much a project will be curtailed under existing or future conditions.
- In accordance with "orthodox" project-cost-based pricing, the impacts of curtailment would have to be considered in one way or another so that the full costs of the project would be recovered in the FiT whether or not the generator is curtailed.
 - Prices could be adjusted for the fact that costs would have to be recovered assuming that the generator would be curtailed without payment some fraction of the time, or

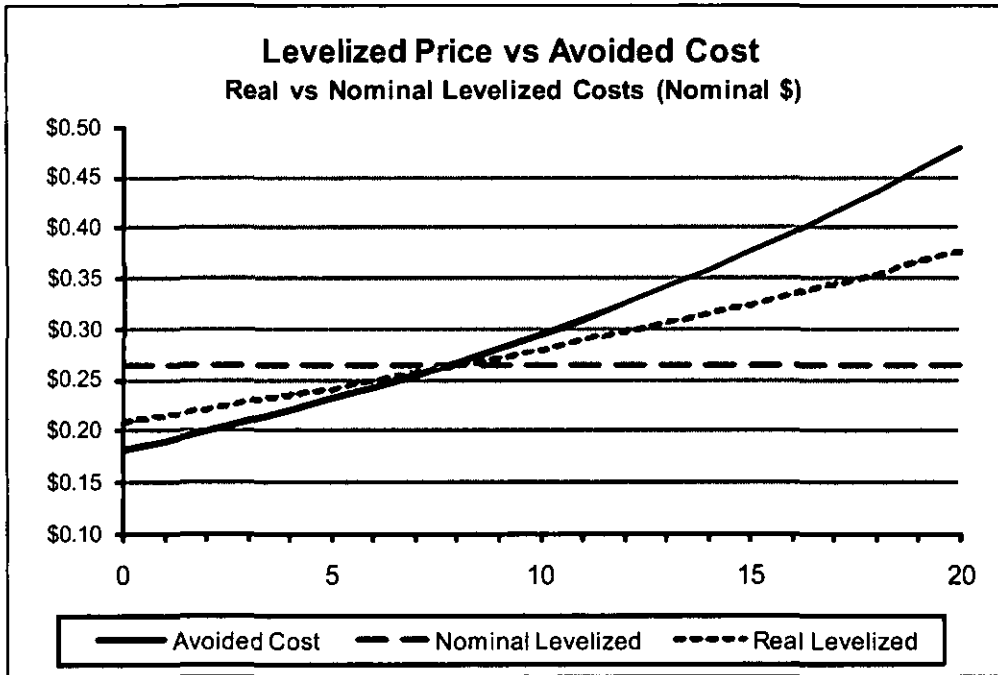
- Prices could be based assuming no curtailment and the utility would pay for power made available but not delivered during periods of curtailment
- The HECO Companies are reluctant to pay for power even if it is curtailed, at least in part, because this would constitute a “take-or-pay” contract and would be considered a fixed obligation in determining company debt obligations.

The extent of this issue depends on the extent of curtailment. This is difficult to determine although it is clear that it is (a) currently primarily an issue for wind resources and (b) is a substantial issue on the Island of Hawaii, an imminent issue on the Island of Maui and a non-issue on the Island of Oahu. As the penetration of as-available energy generation increases the magnitude of the curtailment issue increases.

HDA notes that where curtailment is an existing issue for wind resources, additional wind resources will only exacerbate matters. HDA suggests that to the extent that curtailment is a substantial economic concern that would require incorporation and increases in viable FiT rates, subscription should be terminated until improvements are made to the utility grid to economically accommodate additional generation. For the Island of Hawaii the initial cap for wind generation should be zero since wind resources are already periodically curtailed due to minimum loads on that system.

- 7. How should the FiT rates consider tax policies for renewables?**
- 8. Should the FiT rate to which a project is otherwise entitled, be adjusted downward to reflect any rebates of other financial benefits received by the project?**
- 9. Should the FiT automatically reflect changes in tax law and renewables programs or should such changes take place in periodic updates?**
- 10. How should the FiT account for project reliability benefits or lack thereof?**
- 11. Once a project receives a FiT rate, under what circumstances should its FiT rate change?**
- 12. Should the FiT contain baseline rates for new technologies?**
- 13. How should FiT rates account for inflation?**

Prices for each FiT contract can be escalated during the term of the contract to account for inflation or more closely match increasing avoided costs. Prices could be structured so that the net present value of the increasing stream of prices is identical to nominally levelized prices. This would serve several beneficial purposes. It would reduce rate impacts in the early years of the contract period when FiT rates would tend to be higher compared to avoided costs. It would allocate the costs and benefits of the FiT contract more fairly between current and future ratepayers. It would reduce the incentive for energy generators to walk away from the FiT contract in later years when avoided costs are likely to be higher than the FiT rate and maintenance costs on aging projects become higher.



The chart above shows twenty year avoided costs and the nominal levelized rate and real levelized rate associated with a FiT tariff. All of these cost streams have the same net present value. In other words, the nominal and real levelized FiT rates shown are equivalent in value to avoided costs.

Note that in the early years the levelized FiT rates are more than the avoided costs indicating that there would be upward pressure on rates in the early years. Levelizing the costs on a real basis (such that the FiT rate would be the same over the contract period after adjustment for inflation) would reduce the disparity between the FiT rate and short run avoided costs and decrease rate impacts. The escalation rate of the FiT price stream could be some appropriate rate other than the anticipated rate of inflation. It could, for example, be set at an estimate of the rate of escalation in avoided costs.

Note also that in the later years of the contract avoided costs would be substantially higher than the FiT rate and a generator could make more money if there were an option to sell energy elsewhere.

14. How could FiT rates comply with the “avoided cost” provision on HRS 269-27.2?

V. What non-rate terms are necessary to make FiTs just and reasonable?

- 1. What should be the term of the FiT?**
- 2. Is there a need for a service contract along with the feed-in tariff, or should the tariff itself contain all the necessary legal rights and obligations?**
- 3. What should be the rights and obligations associated with project output on expiration of the FiT term?**

There was some discussion at the panel hearing that, since FiT tariffs would be based on fully allocated project costs (including profit), the utility might have some ownership or interest in the project at the termination of the contract term. HDA does not recommend this approach. Project operators need to have a vested interest in the upkeep and maintenance of the project throughout the contract term. This is especially important in the later years of the contract when maintenance costs tend to be higher. The FiT rate escalation proposal offered by HDA in the discussion of issue IV.13 above would address this to some extent by keeping the value of the FiT rate high enough at the end of the contract term to encourage continued energy production.

HDA suggests that the FiT tariff or contracts provide that the utility should have first right to energy produced by the project at the FiT rate over the life of the contract term and at the end of the contract period should have first right to extend the contract at the same

FiT rate. Although the FiT rate includes “payment” for the full investment costs of the project which should be should be fully amortized at the end of the contract, it is likely that the FiT rate will represent a value to the utility due the anticipated increases in avoided costs. This approach would give the utility an option to continue to purchase at the FiT rate beyond the contract term as compensation for guaranteeing the purchase of power over the life of the project, including fully allocated project development costs.

- 4. What FiT attributes should be subject to periodic reexamination?**
- 5. When should periodic reexaminations occur?**
- 6. What data should FiT projects have to submit?**
- 7. Who should receive renewable energy credits and green attributes?**
- 8. Should the tariff state the possibility that the commission can suspend the FiT based on reliability concerns?**

VI. Utility cost recovery: What principles should apply?

- 1. Are either additions to rate base or assured recovery of the utility appropriate?**

Because the implementation of renewable generation is mandated by the RPS statute and because the utility would be obligated to purchase power from FiT energy generators, the utility should be assured of recovery of FiT costs. Although it is outside the scope of this proceeding, if it would lower utility risk and costs of debt, the assurance of payment could be required by statute.

- 2. How should FiT costs be allocated to the customers of the three HECO companies?**

VII. What are the appropriate processes for accepting and interconnecting FiT projects?

- 1. What queuing and interconnection procedures should FiT projects use?**
- 2. What, if any, modifications should be made to Rule 14 provisions for penetration of generating sources and remote control?**

VIII. If the Commission does approve FiTs, what actions can it take to keep total costs reasonable?

HDA proposes the following general procedure for determining just and reasonable FiT tariff prices. The goal is to determine the necessary feed-in tariff prices to make renewable projects feasible and find a proper balance between the competing objectives of using higher prices to encourage vigorous project development versus using lower prices to encourage cost effectiveness and limit harmful ratepayer impacts:

- Step 1 - Use data and formulas, competitive bidding results or other empirical information to determine a range of project costs for each candidate technology.
 - Low end of the range ⇔ What price is necessary to support the most cost-effective projects for each technology?
 - High end of the range ⇔ What price would capture essentially all feasible projects?
- Step 2 – Determine the physical and potential contractual characteristics, limits and benefits for each technology in the context of each utility transmission and generation system:
 - Variability of the resource: Does the resource require mitigation measures or incur utility system costs in order to accommodate the resource? (Wind generation does, for example),

- Is the resource “co-firm” or coincident with utility load components (for example: solar technologies are available when air conditioning loads are highest.)
- Is the resource able to shape the availability of supply (solar thermal vs photovoltaic resources)?
- Is the resource dispatchable? Does it provide firm capacity?
- Is the resource curtailable?
- Can the resource provide operational reserve, voltage regulation or other ancillary system benefits?
- Step 3 – Determine the target objectives of the tariff price and price structure for each technology. Ideally this determination should be made with the benefit of the results of a probative planning process that examines and determines an optimal mix of resources to meet the RPS and other system objectives.
 - Maximize penetration of cost-effective resources that are compatible with high utility system penetration.
 - Capture the most cost-effective projects for technologies with utility system penetration limits.
 - Encourage project designs that provide value to the utility systems (curtailability, voltage support, dispatchable operation reserve, shaping supply, coincidence or coordination with utility loads)
- Step 4 – Structure tariff design(s) and pricing for each technology and project size.

- Price tariffs at the low end of project cost range where feasible penetration is limited in order to procure the most cost-effective projects and minimize the need for penetration caps.
- Price tariffs at the higher end of the project cost range to the extent that the technology can be incorporated into the utility systems at the anticipated resulting levels of subscription and is desirable according to identified policy objectives .
- To the extent that timing of the acquisition of renewable resources allows, set prices at the lower end of the target price range initially to capture the most cost-effective projects at a lower price and increase prices progressively to attain target levels of subscription.
- Where caps are necessary to limit FiT subscription due to rate impact or other concerns, prices could be offered in blocks of limited size with declining prices in successive blocks (i.e. 10MW at \$.20 per kWh, 10MW at \$.18, 10MW at \$.16 per kWh, etc.). In a succeeding year the sizes and prices for each block could be adjusted based on previous year subscription. This would limit the amount of subscription above avoided cost and would provide market-based information to the Commission regarding the most economical price for encouraging resource subscription.
- To the extent that it is practical, unbundle tariff components to encourage project design features that provide value to the utility system.

- Provide a base bulk energy delivery price.
- Provide adders, as appropriate for each technology, to encourage desirable project design features and/or contractual terms (dispatchability, supply shaping, voltage regulation, operation reserve, curtailability, disposition of green credits, contract extension terms, etc.)
- Include or exclude costs of interconnection in the tariff price based on technology and project size.
 - For technologies and small distribution level projects for which interconnection costs tend to be uniform and proportional to project size, interconnection costs could be included in the tariff price to reduce transaction costs.
 - For technologies and larger projects where interconnection projects differ substantially from project to project, interconnection costs should be excluded from the tariff price and compensation should be determined on a project by project basis.
- In order to minimize rate impacts for technologies with nominal levelized costs/prices above near term spot avoided costs, structure prices to increase over the term of each contract by a constant annual escalation maintaining the

net present value of the project term cost stream. This approach is explained at more length in the discussion of issue IV.13 above.

- 1. Should the Commission limit the FiT scope (i.e., eligible technologies, project size) initially? If so, at what rate should the commission then expand the scope?**
- 2. Should the commission establish purchase caps as a means of keeping total costs reasonable? If so, what purchase caps should the FiT contain?**
- 3. Should the FiT rates decline over time?**
- 4. Should the tariff state the possibility that the commission can suspend the FiT based on cost concerns?**

Dated: June 11, 2009; Haiku, Hawaii

Signed: CARL FREEDMAN

Carl Freedman
dba Haiku Design and Analysis

CERTIFICATE OF SERVICE

The foregoing HAIKU DESIGN AND ANALYSIS OPENING BRIEF was served by electronic transmission on the date of signature below to the following parties in this docket except that as noted, the Division of Consumer Advocacy was also served two copies on the same date by first class mail:

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Dated: June 11, 2009; Haiku, Hawaii

Signed: CARL FREEDMAN
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